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(54) Explosion-resistant wall

(57) An explosion resistant wall comprises a wall surface (1) of plate material which has corrugations with top surfaces (4) and bottom surfaces (3) which are parallel to the principal plane of the wall. Side surfaces (5) connect the top and bottom surfaces (4; 3) and form corners (7; 8) therewith. The corners (8) lying closest to the source of a potential explosion pressure (P) are reinforced by means of plate angles (9) which follow the form of the wall surface (1) in the corner portions. The wall surface (1) is put together from plate elements having partly overlapping surface portions (3) which form the surfaces (2) of the wall surface, said overlapping portions being welded to each other. The plate elements are also provided with reinforcing end plates (6), which likewise are welded to each other.

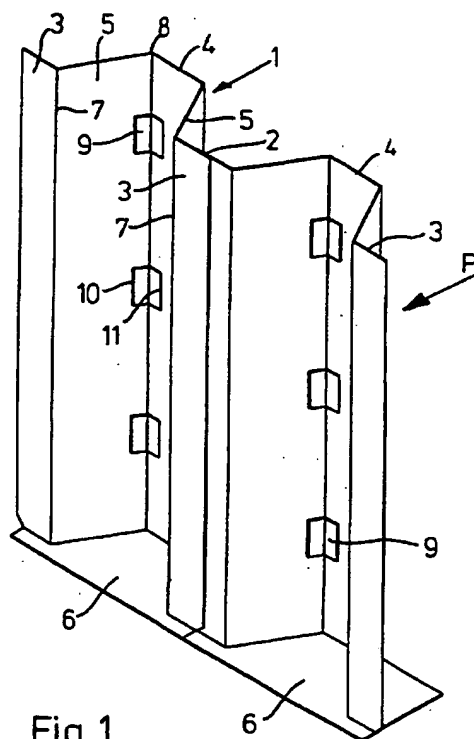


Fig. 1

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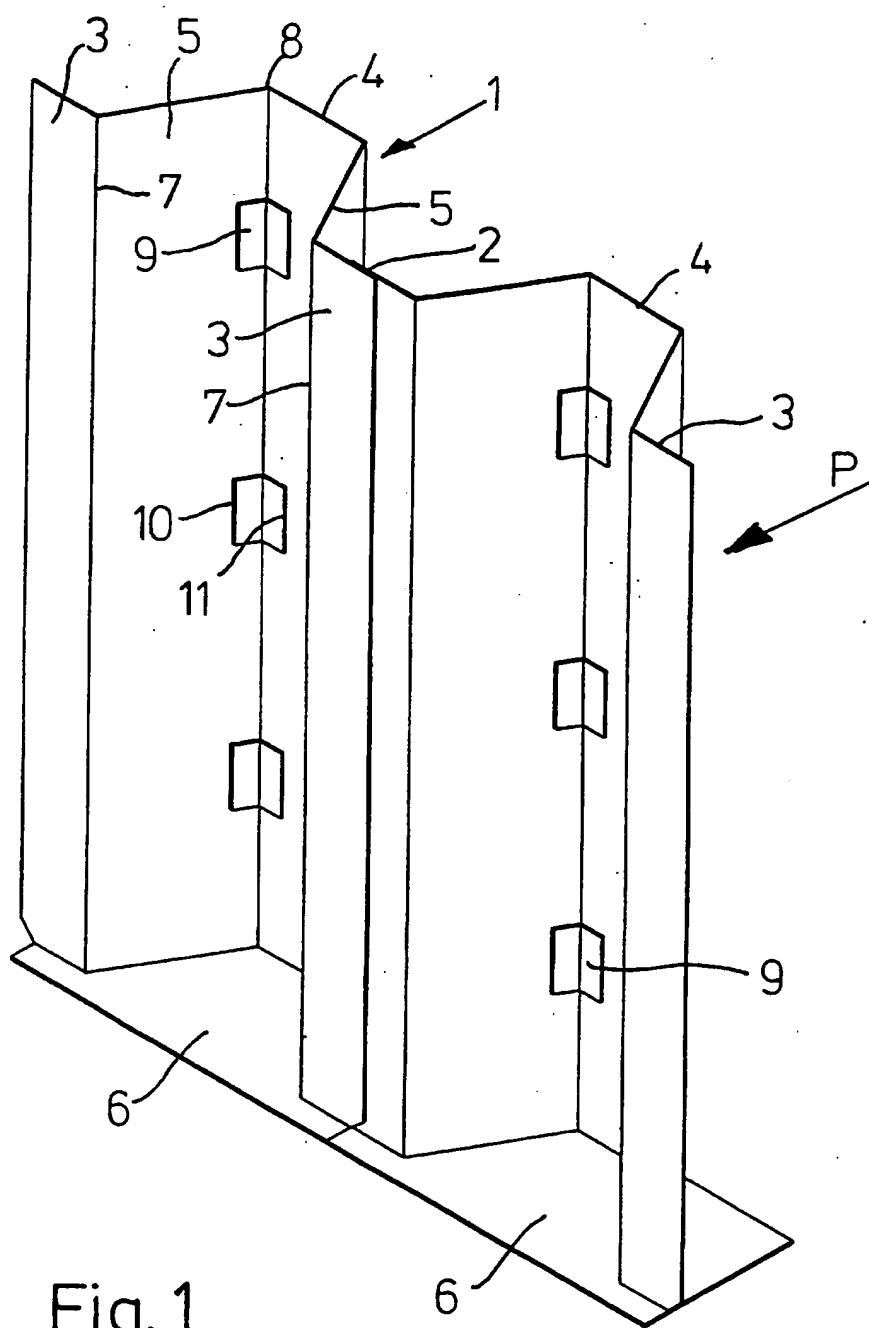


Fig. 1

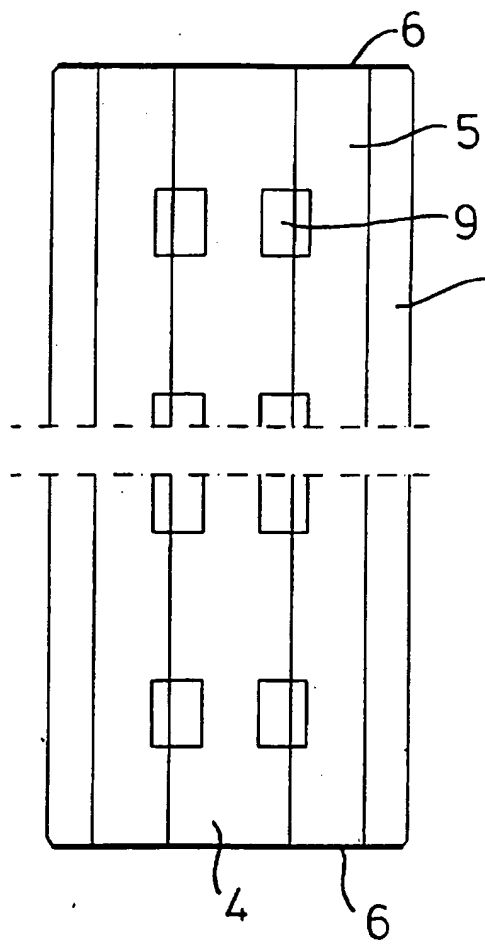


Fig. 3

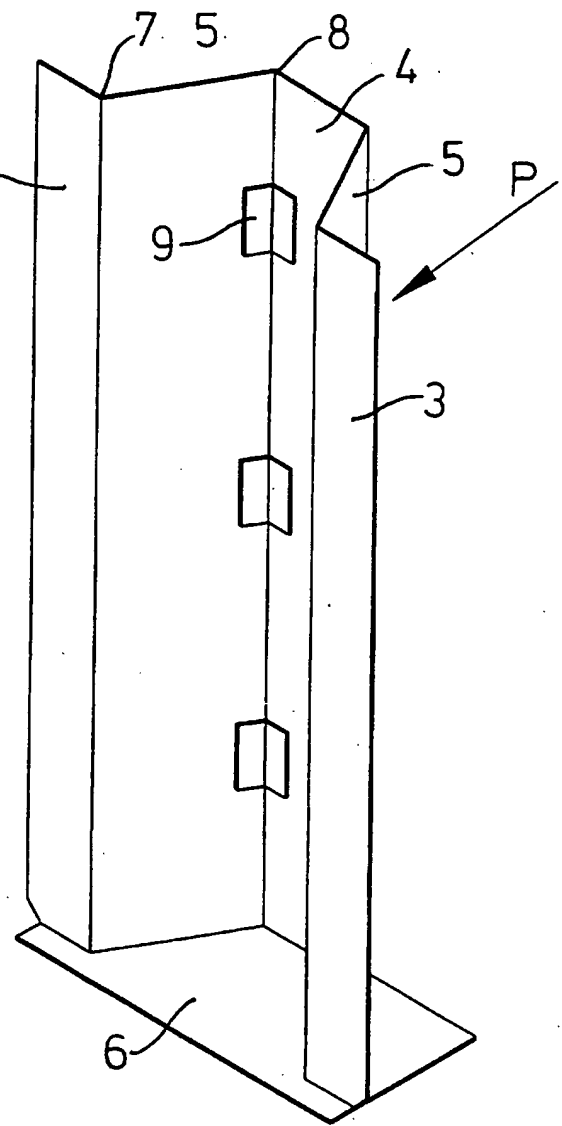


Fig. 2

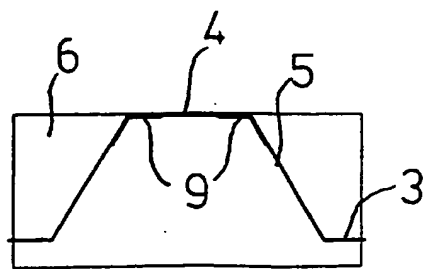


Fig. 4

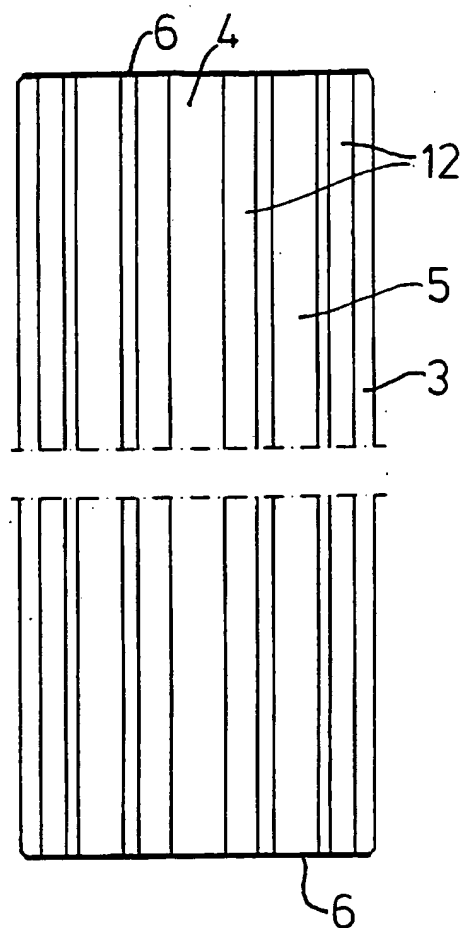


Fig. 6

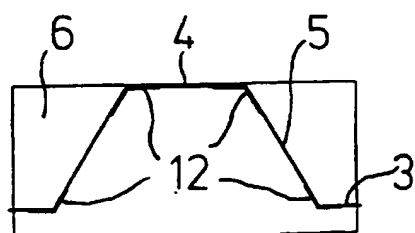


Fig. 7

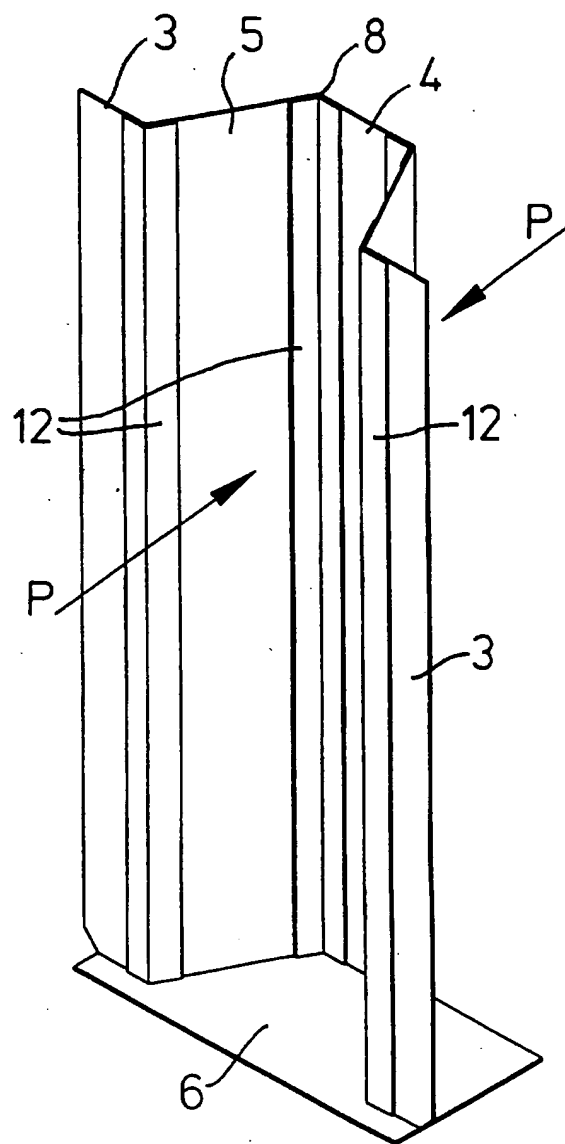


Fig. 5

EXPLOSION RESISTANT WALL

The present invention relates to an explosion resistant wall, comprising a wall surface of plate material having corrugations with top surfaces and bottom surfaces which are parallel to the principle plane of the wall and with side surfaces connecting the top and bottom surfaces and forming corners therewith, said wall surface on at least one of its sides being provided with reinforcement plates which along one of its side edges are joined to a side surface of the wall surface.

Such an explosion resistant wall is i.a. known from Norwegian patent No. 175 271. In this known wall the reinforcement plates are constituted by flat plate elements which are welded between opposite side surfaces of the wall on the side facing away from the possible explosion pressure. If the reinforcement plate extends in the entire height of the wall surface, a hollow space will be formed behind the reinforcement plate where condensation and corrosion may take place if the wall surfaces of the hollow space are not coated with a protective substance. The hollow space also becomes difficult to fill with insulation material. If this known wall is to be built so that it can withstand explosion pressure from both sides, it must be provided with reinforcements plates on both sides. This is disadvantageous from a production point of view because the plate first must be welded on one of the sides and thereupon turned around for welding on the other side. Furthermore, it will be difficult to upgrade a wall, which originally is installed for explosion pressure from one of the sides, to a wall which may take pressure from both sides because the wall will often be provided with insulation on the pressure side. The known solution also has the drawback that the material properties of the reinforcements plates cannot be optimally utilized.

The purpose of the present invention is to provide an explosion resistant wall of the type described above which is not suffering from the above mentioned drawbacks and deficiencies.

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This is obtained according to the invention by letting the reinforcement plates be constituted by a plate angle which along another of its edges is attached to a top or bottom surface of the wall surface and which follows the corner
10 formed by the surfaces to which it is joined.

With such an arrangement the reinforcement plates will not form hollow spaces which must be insulated or protected due to the danger of condensation formation and, furthermore,
15 they will not give rise to irregularities of any magnitude in the surface of the wall. In addition, reinforcement plates may be mounted at a later stage on those corners which were not so provided from the start if it should be desirable to upgrade a wall from one-sided to two-sided
20 pressure loading. Since the reinforcement plates are plate angles which adjoin the corners they are mounted on, they may be arranged on one or the other or both sides of the wall. One has also found that the material properties of the reinforcement plates are better utilized so that weight
25 is saved.

In order to provide a better understanding of the invention, it will be described more closely with reference to the exemplifying embodiments shown in the appended drawings, where:
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Figure 1 is a perspective view showing part of a lower portion of an explosion resistant wall according to the invention,
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Figure 2 shows a perspective part of a lower portion of a plate element entering into the wall on Figure 1,

Figure 3 is an elevation of the plate element shown in Figure 2,

5 Figure 4 shows a part of the plate element in Figure 2 in plan view,

Figure 5 shows a view similar to Figure 2 of an alternative embodiment of the plate element,

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Figure 6 shows an elevation of the plate element of Figure 5, and

15 Figure 7 shows an elevation of the part of the plate element shown in Figure 5.

20 The wall portion in Figure 1 comprises a wall surface 1 of plate material which has corrugations having a top surface 2 consisting of two partly overlapping top surface parts 3 which are welded together, bottom surfaces 4 and side surfaces 5. The wall portion further comprises end plates 6 which are welded together.

25 The side surfaces 5 form top corners 7 together with the top surfaces 2 and bottom corners 8 together with the bottom surfaces 4. In the embodiment of the wall portion shown in Figure 1 and of the plate element shown in Figures 2-4, the bottom corners 8 are reinforced with plate angles 9, which along their longitudinal edges 10, 11 are welded to, respectively, the side surface 5 and the bottom surface 4 forming the corner. To obtain sufficient strength, it is usually not necessary to weld the angled transverse edges of the plate angles, but this may nevertheless be done in order to seal any gaps between the plate angles and the side and bottom surfaces. As shown, the plate angles 9 are shorter than the spacing between them, and they cover a relatively small part of the width of the side and bottom

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surfaces. Nevertheless, the plate angles provide the desired increase in the bulging resistance of the wall surface 1 and lead to a considerable weight reduction with respect to the prior art.

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As may be seen, the plate angles are arranged on the opposite side of the wall surface 1 with respect to the possible explosion pressure designated by the arrow P, namely in the bottom corners 8 lying closest to the potential explosion source. Anyhow, there is little or no reason for not arranging the plate angles 9 on the explosion side of the same corners.

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Figures 5-7 illustrate an embodiment where the plate angles 12 extend over the entire length of the corners and where also the top corners 7 are provided with such plate angles. When all the corners are reinforced, the wall can withstand explosion pressure from both sides, such as suggested with the two opposed arrows P.

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For the skilled person it will be clear that the present invention, which is especially well suited for walls in installations handling explosive fluids, for instance offshore platforms, may be modified and varied in a number of ways within the scope of the following claims. The reinforcement plates may advantageously be made of steel, but also other materials having sufficient fire resistance are contemplated, for instance composite materials based on phenolic plastic.

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C L A I M S

1. An explosion resistant wall, comprising a wall surface (1) of plate material having corrugations with top surfaces (2) and bottom surfaces (3) which are parallel to the principle plane of the wall and with side surfaces (5) connecting the top and bottom surfaces (2; 3) and forming corners (7; 8) therewith, said wall surface (1) on at least one of its sides being provided with reinforcement plates (9, 12) which along one of its side edges (10) are joined to a side surface (5) of the wall surface (1), characterized in that the reinforcement plates be constituted by a plate angle (9, 12) which along another (11) of its edges is attached to a top or bottom surface (2; 3) of the wall surface (1) and which follows the corner (7; 8) formed by the surfaces (5; 2, 3) to which it is joined.
2. An explosion resistant wall according to claim 1, characterized in that the plate angles (9) are joined to those corners (8) which are convex on the explosion side of the wall surface.
3. An explosion resistant wall according to claim 1, characterized in that all the corners (7; 8) of the wall surface (1) are reinforced with plate angles (12).
4. An explosion resistant wall according to claim 1 or 2, characterized in that the plate angles (9, 12) are joined to one and the same side of the wall surface.
5. An explosion resistant wall according to claim 4, characterized in that said side is the opposite one of the explosion side.
6. An explosion resistant wall according to claim 4, characterized in that said side is the explosion side.

7. An explosion resistant wall according to a preceding claim, characterized in that the plate angles (12) extend over the entire length of the corners (7; 8).

5 8. An explosion resistant wall according to one of claims 1 - 6, characterized in that each reinforced corner (8) is provided with a plurality of spaced plate angles (9).

10 9. An explosion resistant wall according to claim 8, characterized in that the spacing of the plate angles (9) is larger than their length.

15 10. An explosion resistant wall according to a preceding claim, characterized in that it is comprised by a row of plate elements each comprising a bottom surface (4), two side surfaces (5) and two top surface portions (3) having a width exceeding half of the width of the top surfaces (3), said plate elements preferably being provided with end plates (6).

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11. An explosion resistant wall substantially as herein described with reference to, and as shown in any of Figures 1 to 4 or any of Figures 5 to 7 of the accompanying drawings.



Application No: GB 9618533.5
Claims searched: 1 - 11

Examiner: J D Cantrell
Date of search: 25 September 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): E1D: DF115. DLEQWNV, DLEKMNV, DCF

Int Cl (Ed.6): E04B, E04H

Other: ON - LINE : WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2002436 A SCHIEBROEK	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.